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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/816,872	03/22/2001	Lutfollah Maleki	06618-605001 / CIT 3188	6064

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EXAMINER

MENEFEE, JAMES A

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/816,872

Applicant(s)

MALEKI ET AL.

Examiner

James A. Menefee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 March 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

Response to Amendment

In response to the amendment filed 11 March 2003, claims 19-25 are added. Claims 1-25 are pending.

Specification

The abstract of the disclosure is objected to because it does not sufficiently describe the invention. The abstract must be an adequate and clear statement of the contents of the disclosure. Further detail should be provided. Correction is required. See MPEP § 608.01(b).

Drawings

The drawings are objected to because they include marks written in pen (for example, input/output designations on Figs. 2A-2C, reference symbols on Figs. 6A-6B). Such marks should be printed on the drawing, rather than written in pen. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Terminal Disclaimer

The terminal disclaimers filed on 11 March 2003 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of either US Patent No. 6,487,233 or US Patent No. 6,389,197 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. These claims discuss the shaping of the resonator so that there is an eccentricity in the resonator. However, there is not discussed the way that the resonator must be shaped so that the properties of the resonator as claimed (i.e. the free spectral ranges) will necessarily exist in the resonator. The structure as claimed does not sufficiently describe the shaping of the resonator, what the eccentricity should be and how it should be made, such that these conditions will necessarily occur.

Regarding claim 2, the eccentricity is claimed as greater than 0.5, however it is not claimed what this represents. The definition of the eccentricity should be sufficiently explained, for example with the equation in the specification.

Regarding claim 10, the dimension is claimed. However, it is not known what this dimension represents. More clarity of what should be less than 10 mm should be added.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 and 6-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Stone et al. (US 5,742,633). Stone discloses the claimed invention as follows:

Regarding claim 1, Stone discloses a device comprising a whispering gallery mode resonator formed of a spheroid made of an optical dielectric material and shaped with an eccentricity. The rest of the claim limitations are not explicitly disclosed. However, since the structure of the prior art meets the structure of the claim, such properties of the claimed structure are deemed to be inherent.

Regarding claim 2, looking at the eccentricity as defined by the specification of the present invention may be greater than 0.5.

Regarding claims 3 and 6, Stone discloses there may be a prism to evanescently couple energy into or out of the resonator (col. 4 lines 32+).

Regarding claim 7, the resonator may be a rare earth doped dielectric material.

Claim 19 is rejected under 35 U.S.C. 102(b) as being anticipated by Flory et al. (US 5,652,556). Flory discloses a device comprising an optical dielectric material and including a region to support different sets of whispering gallery modes. The resonator is a ring or disk, and thus the region supporting the modes is not part of a sphere (col. 1 line 60 – col. 2 line 30).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stone in view of Little et al. (previously cited J. of Lightwave Tech., vol. 17 no. 4, Aug. 1999). Stone discloses the limitations of ~~claims above, but does not disclose the optical coupling fiber tip adjacent the~~ resonator as claimed. Little teaches a whispering gallery mode resonator where a coupling element that is a tapered fiber that evanescently couples optical energy in and out of the resonator. It would have been obvious to one skilled in the art to couple the energy in such a manner because it has been shown to be an effective way of coupling light into the modes of whispering gallery resonators, as taught by Little.

Claims 10-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stone.

Regarding claim 8, it is not disclosed that the resonator is electro-optic, with electrodes to provide a voltage to the material. It is well known that resonators may be made of electro-optic materials, in fact so well known that an entire subclass of the US classification system, 372/12, is drawn to such resonators. It would have been obvious to one skilled in the art to make the resonator of such materials and hook electrodes thereto so that one can adjust the voltage to the resonator using the electrodes, and thus adjust the wavelength of light that will propagate or be transmitted through such a material, thus enabling tuning of the resonator, as is well known.

Regarding claim 9, Stone does not disclose the size of the system. However, it is well known that a mere change in size is evidence of obviousness. There is nothing to suggest that the

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size that is claimed is critical to the operation of the device, thus it would have been obvious to one skilled in the art to adjust the size of Stone's resonator to meet that of the claim.

Regarding claims 10-18, Stone does not disclose using the whispering gallery mode resonator in these optical systems. However, the use of a whispering gallery mode resonator in such systems is well known. The applicant's invention is drawn to using this specific whispering gallery mode resonator as the resonator in such a known system. It would have been an obvious engineering design choice to use the whispering gallery mode resonator of claim 1 that is disclosed by Stone in such a known optical system, thus replacing the standard resonator of such a system.

Claims 20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Flory in view of Schiller et al. (Optics Letters, vol. 16 no. 15, Aug. 1991). Flory discloses the limitations of claim 19, but does not disclose the optical coupling element adjacent the resonator as claimed.

Regarding claims 20 and 23, Schiller teaches a whispering gallery mode resonator where an optical coupling element that includes a prism is located adjacent the resonator and evanescently couples optical energy in and out of the resonator (see p. 1138). It would have been obvious to one skilled in the art to couple the energy in this manner, as this can allow for direct coupling of the resonator, as taught by Schiller.

Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Flory in view of Little et al. (previously cited J. of Lightwave Tech., vol. 17 no. 4, Aug. 1999). Flory

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discloses the limitations of claim 19, but does not disclose the optical coupling element adjacent the resonator as claimed.

Regarding claims 20-22, Little teaches a whispering gallery mode resonator where a coupling element that is a tapered fiber that evanescently couples optical energy in and out of the resonator. It would have been obvious to one skilled in the art to couple the energy in such a manner because it has been shown to be an effective way of coupling light into the modes of whispering gallery resonators, as taught by Little.

Response to Arguments

Applicant's arguments filed 11 March 2003, with respect to claims 1-18 have been fully considered and are persuasive. The double patenting rejection of these claims has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made as shown above.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references teach whispering gallery mode resonators.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (703) 605-4367. The examiner can normally be reached on M-F 8:30-5.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the

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organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JM
May 28, 2003


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